

Agricultural Engineers

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Nature of the Work

Agricultural engineers apply knowledge of engineering technology and biological science to agriculture. They design agricultural machinery and equipment and agricultural structures. They develop ways to conserve soil and water and to improve the processing of agricultural products. Agricultural engineers work in research and development, production, sales, or management.

Employment

More than one third of the 2,400 agricultural engineers employed in 2000 worked for engineering and management services, supplying consultant services to farmers and farm-related industries. Others worked in a wide variety of industries, including crops and livestock as well as manufacturing and government.

Job Outlook

Employment of agricultural engineers is expected to increase about as fast as the average for all occupations through 2010. Increasing demand for agricultural products, continued efforts for more efficient agricultural production, and increasing emphasis on the conservation of resources should result in job opportunities for agricultural engineers. However, most openings will be created by the need to replace agricultural engineers who transfer to other occupations or leave the labor force.

Earnings

Median annual earnings of agricultural engineers were \$55,850 in 2000. The middle 50 percent earned between \$44,220 and \$71,460. The lowest 10 percent earned less than \$33,660, and the highest 10 percent earned more than \$91,600.

According to a 2001 salary survey by the National Association of Colleges and Employers, bachelor's degree candidates in agricultural engineering received starting offers averaging \$46,065 a year and master's degree candidates, on average, were offered \$49,808.



An agricultural engineer sets up tests to measure the amount of nutrients to be applied to a field.

Sources of Additional Information

General information about agricultural engineers can be obtained from:

- American Society of Agricultural Engineers, 2950 Niles Rd., St. Joseph, MI 49085-9659. Internet: <http://www.asae.org>

(See introduction to the section on engineers for information on working conditions, training requirements, and other sources of additional information.)

Biomedical Engineers

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Nature of the Work

By combining biology and medicine with engineering, biomedical engineers develop devices and procedures that solve medical and health-related problems. Many do research, along with life scientists, chemists, and medical scientists, on the engineering aspects of the biological systems of humans and animals. Biomedical engineers also design devices used in various medical procedures, such as the computers used to analyze blood or the laser systems used in corrective eye surgery. They develop artificial organs, imaging systems such as ultrasound, and devices for automating insulin injections or controlling body functions. Most engineers in this specialty require a sound background in one of the more basic engineering specialties, such as mechanical or electronics engineering, in addition to specialized biomedical training. Some specialties within biomedical engineering include biomaterials, biomechanics, medical imaging, rehabilitation, and orthopedic engineering.

Employment

Biomedical engineers held about 7,200 jobs in 2000. Manufacturing industries employed 30 percent of all biomedical engineers, primarily in the medical instruments and supplies industries. Many others worked for health services. Some also worked on a contract basis for government agencies or as independent consultants.

Job Outlook

Employment of biomedical engineers is expected to increase faster than the average for all occupations through 2010. The aging population and the focus on health issues will increase the demand for



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